

**WHAT IS CLAIMED IS:**

1. A method of receiving a paging channel (PCH) using a plurality of paging indicator channels (PICHs) in a user equipment (UE) in a mobile communication system wherein a plurality of PCHs are transmitted at predetermined periods, for paging UEs requesting a broadcasting service, and the plurality of PICHs are transmitted between first and second successive PCHs among the plurality of PCHs, the method comprising the steps of:

receiving a PICH assigned to the UE, if the PICH is among the plurality 10 of PICHs;

determining whether the second PCH corresponding to the broadcasting service will be transmitted by a broadcasting service paging indicator (PI) set in an unused part of the received PICH; and

receiving the second PCH to be transmitted commonly for all UEs that 15 determine that the second PCH will be transmitted to the UEs among UEs that receive the PICH.

2. The method of claim 1, wherein the PICH is assigned by a DRX (Discontinuous Reception) parameter.

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3. A method of notifying an initiation of a broadcasting service in a radio network controller (RNC) in a mobile communication system that includes at least one user equipment (UE), a cell including the UE within a service area of the cell, and the RNC having at least one cell including the cell within a service 25 area of the RNC, for providing broadcasting services through the at least one cell, the method comprising the steps of:

transmitting reception time information to a UE for indicating a time to receive a notification message for paging the UE for a broadcasting service; and

transmitting the notification message to the UE according to the 30 reception time information.

4. The method of claim 3, wherein the reception time information includes information about a time for the UE to start receiving the notification message, and a transmission interval at which the UE receives the notification message, if the notification message is to be repeated a predetermined number of times.

5. The method of claim 3, wherein the notification message is a paging message, and the RNC transmits a paging indicator message to the UE prior to transmitting the paging message.

6. The method of claim 5, wherein the paging indicator message includes a paging indicator for indicating the transmission of the paging message for the broadcasting service.

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7. The method of claim 4, wherein the reception time information is determined using an identity (ID) assigned to the broadcasting service.

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8. The method of claim 7, wherein the reception time information is determined by

$$SFN(PO)=TMGI\_K \bmod PAGING\_INTERVAL + n * PAGING\_INTERVAL$$

where PAGING\_INTERVAL is a transmission interval at which the UE receives the repeated notification message,  $2^{PAGING\_INTERVAL\_COEFF}$ , PAGING\_IINTERVAL\_COEFF is one of integers 0 to 9, n is a positive integer ( $n=1, 2, \dots$ ), TMGI (Temporary Multicast Group Identity) is the ID of the broadcasting service, and K is a number of physical channels established in the cell of the UE, for delivering the notification message.

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9. A method of identifying an initiation of a broadcasting service in a user equipment (UE) in a mobile communication system including a cell, a plurality of UEs within the cell, a radio network controller (RNC) for providing broadcasting services to the plurality of UEs through the cell, and a core network 5 (CN) communicating with the RNC, for providing the broadcasting services, the method comprising the steps of:

receiving from the RNC information about a paging interval at which the UE receives a paging message indicating the initiation of the broadcasting service and an offset by which the UE starts receiving the paging message; and

10 receiving the paging message according to the paging interval and the offset.

10. A method of notifying an initiation of a broadcasting service in a mobile communication system including a cell, a plurality of user equipments 15 (UEs) within the cell, a radio network controller (RNC) for providing broadcasting services to the plurality of UEs through the cell, and a core network (CN) communicating with the RNC, for providing the broadcasting services, the method comprising the steps of:

transmitting, from the CN to UEs that have requested the broadcasting 20 service, reception time information indicating a time to receive a notification message indicating the initiation of the broadcasting service by a response message for the broadcasting service request from the UEs; and

receiving the notification message according to the reception time information in the UEs.

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11. The method of claim 10, wherein the CN further transmits an ID for identifying the broadcasting service by the response message.

12. The method of claim 10, wherein the reception time information 30 includes information about a time for the UEs to start receiving the notification

message, and a transmission interval at which the UEs receive the notification message, if the notification message is to be repeated a predetermined number of times.

5           13.       The method of claim 12, wherein the reception time information is determined using the ID of the broadcasting service.

14.       The method of claim 13, wherein the reception time information is determined by

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$$SFN(PO)=TMGI\_K \bmod PAGING\_INTERVAL + n * PAGING\_INTERVAL$$

where PAGING\_INTERVAL is the transmission interval at which the UEs receive the repeated notification message,  $2^{PAGING\_INTERVAL\_COEFF}$ ,  
15 PAGING\_IINTERVAL\_COEFF is one of integers 0 to 9, n is a positive integer (n=1, 2, . . .), TMGI (Temporary Multicast Group Identity) is the ID of the broadcasting service, and K is a number of physical channels established in the cell of the UEs, for delivering the notification message.

20           15.       A method of transmitting paging information for a second service in a mobile communication system where a paging indicator channel (PICH) signal is transmitted, the PICH signal having a first paging indicator (PI) indicating paging for a first service and a second PI indicating paging for the second service, for providing the first and second services, the method  
25 comprising the steps of:

transmitting information about a paging interval at which the second service paging information is transmitted and an offset by which the second service paging information starts; and

30           retransmitting the second service paging information a predetermined number of times from a transmission start point corresponding to the offset.

16. The method of claim 15, wherein the paging interval and the offset are determined for each second service.

5 17. The method of claim 15, further comprising the step of transmitting the paging interval and the offset information to UEs requesting the second service on a common channel.

10 18. The method of claim 15, further comprising the step of transmitting the paging interval and the offset information to a Node B that provides the second service, by a data frame based on a frame protocol.

15 19. The method of claim 18, wherein the data frame includes information about a transmission duration of the PICH signal according to the paging interval and an ID identifying the second service.

20. A method of transmitting paging information for a second service in a mobile communication system where a paging indicator channel (PICH) signal is transmitted, the PICH signal having a first paging indicator (PI) indicating paging for a first service and a second PI indicating paging for the second service, which is different from the first service, for providing the first and second services, the method comprising the steps of:

transmitting from an SGSN (Supporting GPRS Support Node) to an RNC (Radio Network Controller) information about a paging interval at which 25 the second service paging information is transmitted and an offset by which the second service paging information starts, upon a request for the second service from a user equipment (UE);

transmitting the PICH signal including the second PI from the RNC to the UE; and

retransmitting from the RNC to the UE the second service paging information a predetermined number of times from a transmission start point corresponding to the offset.

5        21.      The method of claim 20, wherein the paging interval and the offset are determined for each second service.

22.      The method of claim 21, wherein the paging interval and the offset are determined according to a function of a service ID identifying the  
10 second service.

23.      The method of claim 22, wherein the function is expressed as

$$\text{SFN(PO)} = \text{TMGI\_K} \bmod \text{PAGING\_INTERVAL} + n * \text{PAGING\_INTERVAL}$$

15 where PAGING\_INTERVAL is the transmission interval at which a UE receives  
a repeated notification message,  $2^{\text{PAGING\_INTERVAL\_COEFF}}$ ,  
PAGING\_IINTERVAL\_COEFF is one of integers 0 to 9, n is a positive integer  
(n=1, 2, . . .), TMGI (Temporary Multicast Group Identity) is an ID of the  
broadcasting service, and K is a number of physical channels established in the  
20 cell of the UE, for delivering the second service paging information.

24.      The method of claim 21, wherein the paging interval and the offset are set to predetermined values.

25        25.      The method of claim 20, further comprising the step of  
transmitting from the RNC to the UE the paging interval and the offset  
information on a common channel.

26. The method of claim 20, further comprising the step of transmitting from the RNC to a Node B the paging interval and the offset information by a data frame based on a frame protocol.

5 27. The method of claim 26, wherein the data frame includes information about a transmission duration of the PICH signal according to the paging interval and an ID identifying the second service.

28. A method of receiving paging information for a second service  
10 in a mobile communication system where a paging indicator channel (PICH) signal is received, the PICH signal having a first paging indicator (PI) indicating paging for a first service and a second PI indicating paging for the second service different from the first service, for providing the first and the second services, the method comprising the steps of:

15 receiving information about a reception interval at which the second service paging information is received and an offset by which the second service paging information starts to be received;

receiving the PICH signal at a predetermined time and detecting the second PI from the PICH signal; and

20 receiving the second service paging information according to the reception interval and the offset information, if the second PI indicates the presence of the second service paging information.

29. The method of claim 28, wherein if the reception start point corresponding to the offset from a time when the second PI is detected has already elapsed, the second service paging information is received at a next reception start point in the second service paging information receiving step.

30. The method of claim 28, wherein the reception interval and the offset information is determined according to a channel condition for each cell.

31. A method of transmitting paging information for a second service to provide a first service and the second service in a mobile communication system where a first service PI indicating the presence of the first 5 service, which is different from the second service, and a first service paging information bitmap indicating a transmission position of paging information for the first service are transmitted by a frame protocol message, the method comprising the steps of:

generating the frame protocol message including a second service 10 indication indicating the presence of a second service paging information bitmap and the second service paging information bitmap having a second service PI indicating the presence of the second service paging information, if it is determined that the second service paging information is to be transmitted; and

transmitting the generated frame protocol message to a Node B.

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32. The method of claim 31, wherein the frame protocol message further includes information about the transmission position of the second service paging information.

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33. The method of claim 31, wherein it is determined that the second service paging information is to be transmitted when a response for a second service activation request is received from an SGSN (Serving GPRS Support Node).